# Claims

[c1]     1.A de-mapping method for a wireless communications system, the communications system comprising a transmitter and a receiver, the transmitter comprising an encoder, a mapping device, a signal modulator and a transmitting module, the receiver comprising a receiving module, a signal demodulator, a de-mapping device and a decoder, and the method comprising the following steps:

(a)encoding at least a bit string with the encoder;

(b)mapping the encoded bit string into a first gray-code-typed I signal and a first gray-code-typed Q signal with the mapping device;

(c)transforming the first gray-code-typed I and Q signals into a first modulated signal with the signal modulator;

(d)transforming the first modulated signal into an RF signal and transmitting the RF signal with the transmitting module;

(e)receiving the RF signal with the receiving module;

(f)transforming the RF signal into a second modulated signal and demodulating the second modulated signal into I signal and a second Q signal with the signal demodulator;

(g)setting an initial I weighting value to be equal to (the second I signal)*(a first bit sign a first threshold value) with the de-mapping device;

(h)setting a following I weighting value to be a product of a bit sign corresponding to an I weighting value preceding the following I weighting value and a difference between the preceding I weighting value and a threshold value corresponding to the preceding I weighting value according to a sign of the preceding I weighting value with the de-mapping device;

(i)setting an initial Q weighting value to be equal to (the second Q signal)*(a second bit sign a second threshold value) with the de-mapping device;

(j)setting a following Q weighting value to be a product of a bit sign corresponding to a Q weighting value preceding the following Q weighting value and a difference between the preceding Q weighting value and a threshold value corresponding to the preceding Q weighting value according to a sign of the preceding Q weighting value with the de-mapping device; and

(k)quantizing all of the I and Q weighting values and transferring all of the quantized I and Q weighting values to the decoder.

[c2]     2.The method of claim 1, wherein the first bit sign in step (g) is equal to 1 and the first threshold value is

equal to zero.

3.The method of claim 1, wherein the de-mapping device in step (h) determines signs of all I weighting values preceding the following I weighting value and sets the following I weighting value thereafter.

[c3] 4.The method of claim 1, wherein the second bit sign in step (i) is equal to 1 and the second threshold value is equal to zero.

5.The method of claim 1, wherein the de-mapping device in step (j) determines signs of all Q weighting values preceding the following Q weighting value and sets the following Q weighting value thereafter.